

4

LABORATORY INVESTIGATION

OWL PELLETS

Problem: *What information about an owl's diet and role in the environment can be learned from an owl pellet?*

INTRODUCTION

Background The owl, like many other carnivorous birds, swallows its prey whole. Many parts of an animal are not digestible, such as hair, feathers, bones, teeth, and the hard outer shells of insects. The owl's digestive system allows it to store these indigestible parts while letting the digestible parts pass to the intestines. The owl then regurgitates the unwanted parts in the form of a pellet. An owl pellet is a roundish mass that is covered with fur and sometimes feathers from its prey. Fresh specimens are shiny and coated with mucus. Bones and other hard remains are located within the interior of the pellet. The pellet can provide evidence of the owl's dietary habits and role in its environment.

The owl plays a role in limiting the population size of its prey. Of the animal species common to an owl's diet, the prey species that is most abundant in the area will be the species most likely to be captured and consumed by the owl. This limits the population size of the herbivore, which in turn protects the supply of plants upon which the prey feeds. Farmers especially appreciate barn owls, which keep populations of crop-eating rodents under control.

Goals In this investigation, you will **observe** the external features of an owl pellet. You will then **reconstruct** and **identify** the skeletons of the prey contained in the pellet, and count the total number of organisms found. Finally, you will **infer** the owl's role in its environment and its place in the food web.

LAB WARMUP

Concepts A *dichotomous key* is one tool scientists use to identify organisms. Each step of the key has two descriptions, and the organism being identified fits one of the two descriptions. Next to each description, the key either gives the name of the organism or directs the person to another step. The key is followed until the animal is identified.

Review Sections 4.1, Roles of Living Things, and 4.2, Ecosystem Structure, should be completed before beginning this investigation. You should also understand the following terms before you perform this investigation.

predator producer consumer carnivore herbivore dichotomous key

Make a **prediction** about the outcome of this experiment and write it in the Lab Notebook.

MATERIALS (PER GROUP)

- barn owl pellet
- metric ruler
- glass jar with lid
- water
- dishwashing liquid
- 2 pieces of cheesecloth cut into 6-cm squares
- bowl
- 2 sheets of white paper
- forceps, probe, or toothpicks
- field guides to mammals and birds
- books of animal skeletons



Wash your hands thoroughly after completing this lab.

1. Examine the outside of the owl pellet. Measure and record its length and width in centimeters. Describe external features in the Lab Notebook.
2. To investigate the interior of the pellet you must soften it by soaking it in water. Fill the jar halfway with water. Add a drop of dishwashing liquid and the pellet to the jar. Close the jar and shake gently for about 30 seconds. Let the jar stand for five minutes and shake again. When the pellet has fallen apart, pour the contents of the jar through two layers of cheesecloth. Collect the strained liquid in a sink or bowl.
3. Place the contents of the pellet on a piece of white paper. Pick bones, teeth, insect parts, and any other prey evidence out of the fur. Use probes, toothpicks, or forceps as necessary, but proceed carefully to avoid crushing any small bones. Put the animal remains on a second piece of paper. Discard the fur and other soft matter in a safe manner.
4. Label the skulls by number, and identify them. Use the key below to identify mammal skulls found in the owl pellet. You do not need the mandible (lower jaw) to identify skulls using the key. Use the pictures of skulls in Figure 4.2, as well as any field guides you may have, to aid in identification. Record the species of each skull in your Lab Notebook.

Does the animal have...

1. a) 3 or fewer teeth on each side of its upper jaw?
b) at least 9 teeth on each side of its upper jaw?
2. a) 2 biting teeth on its upper jaw?
b) 4 biting teeth on its upper jaw?
3. a) a skull length of 23 mm or less and brown teeth?
b) a skull length of more than 23 mm and 44 teeth?
4. a) the roof of its mouth extending past the last molar?
b) the roof of its mouth not extending past the last molar?
5. a) a skull length of 22 mm or less?
b) a skull length of more than 22 mm?
6. a) flat molars?
b) rounded molars?

Then...

go to 2.
go to 3.
go to 4.
it's a rabbit.
it's a shrew.
it's a mole.
go to 5.
go to 6.
it's a house mouse.
it's a rat.
it's a meadow vole.
it's a deer mouse.

Figure 4.1 Key to mammals likely to be found in owl pellets

5. Try to match other bones to each skull. Using a book of animal skeletons, identify each bone and record its name under its matching skull in the Lab Notebook.
6. Use a field guide or other reference to find the likely habitat and diet of each species found in the pellet. Record this information in the Lab Notebook.

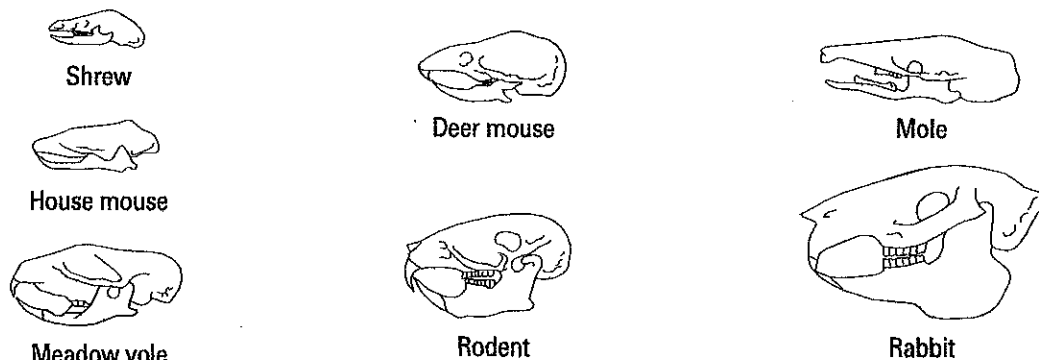


Figure 4.2

Name: _____ Class: _____ Date: _____

LAB NOTEBOOK: INVESTIGATION 4

PREDICTION _____

OBSERVATIONS

OBSERVATIONS OF OWL PELLET

Length _____ (cm) Width _____ (cm)

External features _____



ANIMAL REMAINS FOUND IN OWL PELLET



	Skull				
	1	2	3	4	5
Species					
Bones found					
Likely habitat					
Likely diet					

Use another sheet of paper if more than five skulls are found.

DATA ANALYSIS

1. How many individual animals did you find in the owl pellet?

2. Were the animals of different species? If so, how many species were represented in the pellets?

3. Did you find any evidence of organisms other than small mammals in the owl pellet?

4. What types of bones are most prevalent in the pellet? What bones are least likely to be found in an owl pellet?



5. What are the habitats of a barn owl's prey? Are they similar to the habitat of the owl?



CONCLUSION











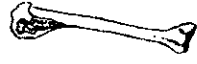

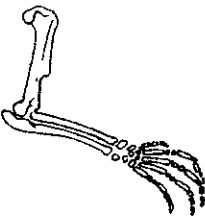
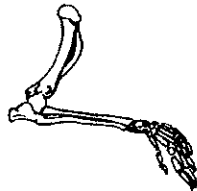
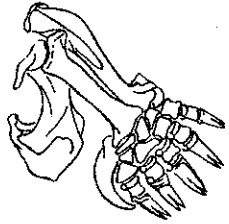

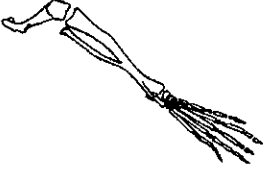
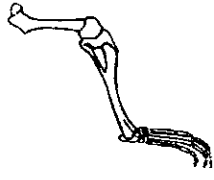

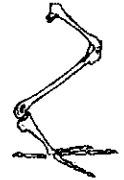
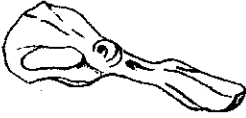






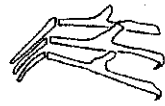
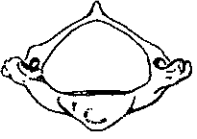






1. **Predict** Other birds also form pellets. What would you expect to find in the pellet of a seagull?

2. **Classify** Describe the role of the owl in its environment and its place in the food web. Is it an herbivore or a carnivore? Is it a producer, a primary consumer, or a secondary consumer? Support your response with your lab results.

EXTENSION

Model Reconstruct and mount the skeletons of animals found in the pellet for use in comparative anatomy. Place the bones in a beaker filled with peroxide water (use half commercial 10%-peroxide and half water). Leave the bones in this solution for 24 hours. Rinse the bones with fresh water and allow them to dry. Reassemble the bones, using white glue to affix them to a piece of poster board.

Owl Pellet Bone Chart

	Rodent	Shrew	Mole	Bird
Skull				
Jaw				
Scapula				
Forelimb				
Hindlimb				
Pelvic Bone				
Rib				
Vertebrae	      			

CB280780000

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OWL PELLET LAB – RUBRIC
ECOLOGY

Presentation of bones – 40 pts.

Identification of species -	20 pts.
Bones are grouped correctly -	10 pts.
Bones were identified -	10 pts.

“Observations” section 2 pts.

Length -	1 pt.
Width -	1 pt.

“Features” section - 7 pts.

Data Table - 15 pts.

Questions – 5 pts each 35 pts.